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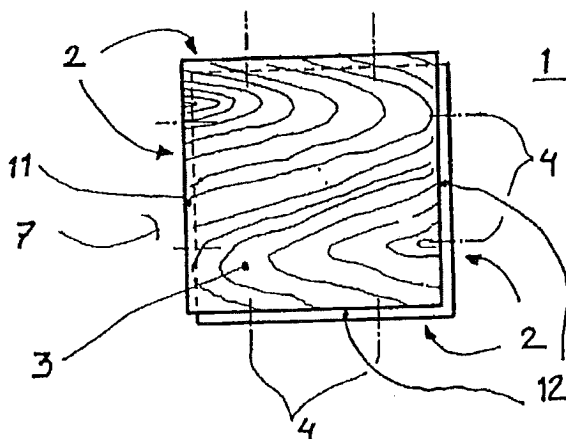
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(54) Title: FLOOR ELEMENT WITH GUIDING MEANS



(57) Abstract: Floor element (1), which is mainly in the form of a board with triangular, quadratic, rectangular, rhomboidal or polygonal shape as seen from above. The floor element (1) is provided with edges (2), a lower side (7) and a decorative upper layer (3). The floor elements (1), which are intended to be joined via tongue and groove are on at least two opposite edges (2), preferably on all edges (2) provided with holes (4). The holes (4) extends inwards from the edge (2) mainly parallel to the decorative upper layer (3). The holes (4) are arranged on a predetermined distance from the decorative upper layer (3) and on a predetermined distance from a closest corner between two adjacent edges (2), whereby the holes (4) are intended to receive each one part of a guiding means (6).



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Floor element with guiding means.

The present invention relates to floor elements which are joined by means of tongue, groove and separate guiding means.

Prefabricated board shaped floor elements which are provided with tongue and groove at the edges are common nowadays. They are very easy to install whereby this can be accomplished by the average handy man. Such floor elements can, for example, be made of solid wood, fibre board or particle board. These are most often provided with a surface layer such as a lacquer or some type of laminate. The boards are most often installed by being glued together via tongue and groove. This type of floor is usually installed so that the boards overlap and the latitudinal joint do not coincide. It has therefore not been any reason to guide the relative longitudinal position between the boards. Designed installations is very difficult to achieve without this possibility. One example where it should be desirable to have coinciding latitudinal as well as longitudinal joint is completely quadratic floor elements. This is very difficult as scales or a very sure eye and great workman skills is required if a successful end result is to be achieved. It is furthermore very easy to dislodge already installed floor elements when installing new ones. It is also sometimes desired to have latitudinal joints coincide over, for example, every other or every third latitudinal joint, when installing with overlap. This requirement is foremost present when floor boards with dissimilar decor is used for creating a decorative effect on larger floor surfaces. This requirement goes for quadratic as well as rectangular floor elements.

It has, through the present invention, been made possible to solve the above mentioned problems, whereby a designed floor installation, even with complex patterns, easily can be installed with great accuracy, even by the average handyman. Thus, the invention relates to floor elements which are mainly in the form of boards with triangular, quadratic, rectangular, rhomboidal or polygonal shape as seen from above. The floor elements are provided with edges, a lower side and a decorative upper layer. The floor elements are intended to be joined by means of tongue and groove. The invention is characterised in that the floor

elements are provided with holes in at least two opposite edges, preferably all four edges, which holes extends inwards from the edge mainly parallel with the upper layer. The holes are arranged at a predetermined distance from the upper decorative layer and at a predetermined distance from the closest edge between two adjacent edges. The holes are intended to receive one part of a guiding means each.

The holes preferably extends perpendicular to the edge where the holes are arranged. Alternatively, the holes extends parallel to the edge which is adjacent to the edge where the holes are arranged. In cases where the corners of the floor boards are right-angled the holes preferably extends perpendicular to the edge where they are arranged and parallel to the edge which is adjacent to the edge where they are arranged.

According to one embodiment of the invention the floor element has four edges with the same length. Each edge is suitably provided with each one hole group of two holes. The holes have, in each hole group, been arranged on a mutual distance of N from each other and that the distance between a hole and its closest edge is $N/2$, whereby the length of the edge is $2N$.

According to a second embodiment of the invention the floor element has two opposite edges with larger length than the two remaining edges. The two shorter edges are suitably provided with each one hole group of two holes. The holes have, in each hole group, been arranged on a mutual distance of N from each other and that the distance between a hole and its closest edge is $N/2$, whereby the length of the edge is $2N$. The two long side edges are provided with each one hole group of three or more holes of which the outermost are arranged on a distance of $L/2$ from the closest edge while the distance between two adjacent holes arranged on the long sides is L , whereby the length of the long side edge is an integer larger than $3L$, preferably smaller than $30L$.

The two long side edges are alternatively provided with each one hole group of three or more holes, of which the outermost holes are arranged on a distance of $L/2$ from the respective closest corner between two adjacent edges. The distance between two adjacent holes arranged on the long side edge is L , $2L$, $3L$, $4L$, $5L$ or combinations thereof. The length L is in both cases suitably equal to the length N .

The holes are suitably provided with an inner, gripping edge. The holes are

thereby suitably provided with an inner gripping edge by milling a groove from the lower side. This groove is then suitably perpendicular to the hole and thereby parallel to the edge where the hole, which is intersected by the groove, is arranged. The hole may alternatively be provided with an inner gripping edge by milling a step with larger diameter than the hole, on a predetermined depth.

The guiding means are then suitably provided with each two ends which each are provided with one or more resilient projections. These projections are intended to interact with the gripping edges of the holes.

The invention is further illustrated by means of enclosed figures showing different embodiments of a flooring material according to the present invention whereby,

-figure 1a shows, seen from above, an embodiment of a floor element 1 with a quadratic surface.

-figure 1b shows the embodiment from figure 1a showed from the side.

-figure 2 shows, seen from above, a second embodiment of a floor element 1 with a rectangular surface.

-figure 3 shows, seen from above, yet another embodiment of a floor element 1 with a rhomboidal surface.

-figure 4 shows, seen from above, yet another embodiment of a floor element 1 with a hexagonal surface.

-figure 5 shows, seen from above, yet another embodiment of a floor element 1 with a rectangular surface.

-figure 6 shows, seen from above an embodiment of the invention where quadratic floor elements 1 according to figure 1 and rectangular floor elements 1 according to figure 5 together forms a so-called designed installation.

-figure 7 shows, seen from above, an embodiment of the invention where quadratic floor elements from figure 1 forms a so-called designed installation.

-figure 8 shows, seen from above, an embodiment of the invention where rectangular floor elements according to figure 2 forms a so-called designed installation.

-figure 9 shows, seen from above an embodiment of the invention where rectangular floor elements according to figure 5 forms a so-called designed installation.

-figure 10 shows, seen from above, an embodiment where rhomboidal floor elements according to figure 2 forms a so-called designed installation.

-figure 11 shows, seen from above, an embodiment of the invention where rhomboidal floor elements according to figure 2 and hexagonal floor elements according to figure 4 together forms a so-called designed installation.

-figure 12 shows, in cross-section, parts of two floor elements 1 and a guiding means 6 according to one embodiment of the invention.

-figure 13 shows, in cross-section, parts of two floor elements 1 and a guiding means 6 according to a second embodiment of the invention.

-figure 14 shows, in cross-section, parts of two floor elements 1 and a guiding means 6 according to yet another embodiment of the invention.

-figure 15 shows, seen from below, parts of the floor element 1 showed in figure 13.

Accordingly, figure 1a shows, seen from above, an embodiment of a floor element 1 with a quadratic surface, while figure 1b shows the embodiment from figure 1 as seen from the side. The floor element 1 is provided with edges 2, a lower side 7

and a decorative upper layer 3. The floor element 1 is also provided with groove 11 and tongue 12. The floor element 1 is in all edges 2 provided with holes 4, which holes extends inwards from the edge 2 mainly parallel to the upper decorative layer 3. The holes 4 are intended to receive each one part of a guiding means 6 (fig. 12). The holes 4 extends parallel to the edge 2 which is closest adjacent to the edge 2 where the holes 4 are arranged. The floor elements 1 are on each edge 2 provided with each one hole group of two holes 3. The holes have, in each hole group, been arranged on a mutual distance of N . The distance between each hole 4 and its closest corner between two adjacent edges is $N/2$. the length of the edge is hereby $2N$.

Figure 2 shows, seen from above, a second embodiment of a floor element 1 with a rectangular surface. The floor element 1 is provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor element 1 is also provided with groove 11 and tongue 12. The floor element 1 is in all edges 2 provided with holes 4, which holes extends inwards from the edge 2, mainly parallel to the upper decorative surface 3. The holes 4 are intended to receive each one part of a guiding means 6 (fig. 12). The holes 4 extends parallel to the edge 2 which is closest adjacent to the edge 2 where the holes 4 are arranged. The two shorter edges 2 are each provided with each one hole group of two holes 4, which holes have, in each hole group, been arranged on a mutual distance of N . The distance between each hole 4 and its closest corner between two adjacent edges is $N/2$. The length of the edge is hereby $2N$. The two longer edges are provided with one hole group of five holes 4 each. The outermost holes has been arranged on a distance $L/2$ from its respective closest edge 2 while the distance between two adjacent holes 4, on the two longer edges 2, is L . The length of the longer edge 2 is thereby $5L$. The length L is equal to the length N .

Figure 3 shows, seen from above, yet another embodiment of a floor element 1 with rhomboidal surface. The floor element 1 is provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor element 1 is also provided with groove 11 and tongue 12. The floor element 1 is in all edges 2 provided with holes 4, which holes extends inwards from the edge 2, mainly parallel to the upper

decorative surface 3. The holes 4 are intended to receive each one part of a guiding means 6 (fig. 12). The holes 4 extends parallel to the edge 2 which is closest adjacent to the edge 2 where the holes 4 are arranged.

According to an alternative embodiment the holes extends parallel to the edge 2 which is adjacent to the edge 2 where the holes 4 are arranged. This orientation of the holes 4 facilitates certain forms of design installations.

The floor element 1 is on all edges 2 provided with each one hole group of two holes 4. The holes 4 have, in each hole group, been arranged on a mutual distance of N . The distance between each hole 4 and its closest corner between two adjacent edges is $N/2$. The length of the edge is hereby $2N$.

Figure 4 shows, seen from above, yet another embodiment of a floor element 1 with a hexagonal surface. The floor element 1 is provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor element 1 is also provided with groove 11 and tongue 12. The floor element 1 is on all edges 2 provided with holes 4, which holes 4 extends inwards from the edge 2, mainly parallel to the upper decorative surface 3. The holes 4 are intended to receive each one part of a guiding means 6 (fig. 12). The holes 4 extends parallel to the edge 2 which is closest adjacent to the edge 2 where the holes 4 are arranged. The floor element 1 is on all edges 2 provided with each one hole group of two holes 4. The holes 4 have, in each hole group, been arranged on a mutual distance of N . The distance between each hole 4 and its closest corner between two adjacent edges is $N/2$. The length of the edge is hereby $2N$.

Figure 5 shows, seen from above, yet another embodiment of a floor element 1 with rectangular surface. The floor element 1 is provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor element 1 is also provided with groove 11 and tongue 12. The floor element 1 is in all edges 2 provided with holes 4, which holes extends inwards from the edge 2, mainly parallel to the upper decorative surface 3. The holes 4 are intended to receive each one part of a guiding means 6 (fig. 12). The holes 4 extends perpendicular to the edge 2 where the holes 4 are arranged. The holes 4 furthermore extends parallel to the edge 2 which is closest adjacent to the edge 2 where the holes 4 are arranged. The two

longer edges 2 are provided with one hole group of eight holes 4 each. The outermost holes has been arranged on a distance $L/2$ from its respective closest edge 2 while the distance between two adjacent holes 4, on the two longer edges 2, is L and $3L$ respectively. The length of the longer edge 2 is thereby $12L$. The length of the shorter edges 2 is $2L$.

The floor element may also, as shown in figure 2, be provided with holes 4 on the two shorter edges 2. These edges 2 are then provided with one hole group of two holes 4 each. The holes 4 are then arranged with a mutual distance of L . The distance between each hole 4 and its closest corner between two edges 2 are $L/2$. The length of the edge 2 is as before $2L$.

Figure 6 shows, seen from above, an embodiment of the invention where quadratic floor elements 1 according to figure 1 and rectangular floor elements 1 according to figure 5 together forms a designed installation. Tongue 12 and groove 11 is for the matter of clarity not shown. The quadratic floor elements 1 corresponds completely to the one shown in figure 1. The rectangular floor elements 1 correspond mainly with the one shown in figure 5, the two shorter edges are however provided with holes 4 which corresponds to the edges 2 of the quadratic floor element 1. The installation can accordingly be initiated by joining five quadratic floor elements 1 by means of one or two guiding means 6 (fig. 12) per floor element so that a rectangular unit is formed. This may then be joined with a rectangular floor element 1 by means of one or more guiding means so that a part corresponding to $2L$ of the longer edge on the floor element 1 is left free. The quadratic floor elements 1 may alternatively be joined directly with the rectangular floor element 1 without first having to be joined with each other. Another rectangular floor element 1 is then joined at an angle, with the already joined floor elements 1. One or more guiding means are used also here for the positioning of the floor elements 1. Further quadratic floor elements 1 are added to the already installed floor elements 1 until a square consisting of twenty-five quadratic floor elements 1 is formed. Another two rectangular floor elements 1 are then assembled at an angle so that the four rectangular floor elements 1 together forms a frame around the quadratic floor elements 1. Guiding means 6 are foremost used for the positioning the rectangular floor elements 1 to each other as

they give the main shape of the installation pattern. Guiding means 6 should however be used on at least every first row of quadratic floor elements 1. The arrows illustrates how further floor elements 1 are joined with the previously installed.

A floor element 1 most often includes a core covered with an upper decorative layer 3. The core is most often comprised by wood particles or wood fibre bonded with resin or glue. It is advantageous to surface treat the area around the joint if the floor is to be exposed to moisture since the wood of the core is sensitive to moisture. This surface treatment may suitably include resin, wax or some kind of lacquer. It is not necessary to surface treat the joint if it is to be glued as the glue itself will protect the core from moisture penetration. The decorative upper layer 3 is constituted by a decorative paper impregnated with melamine formaldehyde resin. One or more layers of so-called overlay paper of α -cellulose which is impregnated melamine formaldehyde resin may possibly be placed on top of this. One or a few of these layers may be sprinkled with hard particles of α -aluminium oxide, silicon carbide or silicon oxide during the impregnation in order to improve the abrasion resistance. The lower side 7 may suitably be surface treated with lacquer or a layer of paper and resin.

Figure 7 shows, seen from above, an embodiment of the invention where quadratic floor elements 1 according to figure 1 forms a so-called designed installation. The quadratic floor elements 1 corresponds completely with the ones shown in figure 1. The installation can accordingly be initiated by joining quadratic floor elements 1 by means of one or two guiding means 6 (fig. 12) per floor element 1 so that a unit is formed. The floor elements 1 can be joined so that both longitudinal and latitudinal joints coincides or so that the longitudinal and latitudinal joints are displaced by 1N meaning half of the floor element edge. Guiding means 6 are foremost used for positioning the rows towards another so that the latitudinal joints coincides over the whole floor without forming curves. It is not necessary to use guiding means 6 on every floor element 1. Guiding means 6 should, however, at least be used when joining the outer rows of quadratic floor elements 1.

Figure 8 shows, seen from above, an embodiment of the invention where rectangular floor elements according to fig. 2 forms a so-called designed

installation. The groove 11 and tongue is for the sake of clarity not shown. The rectangular floor elements 1 corresponds completely with the one shown in figure 2. The installation can accordingly be initiated by joining two or more floor elements to a row by means of on or more guiding means 6 (fig. 12) per floor element 1 so that a unit is formed. Further rows are then added to this first row. At least one guiding means 6 per row is used. These should be placed closest to the most visible pattern, which in the figure 8 is illustrated by a number of darker boards, comparable to a crosswalk, if only a few guiding means 6 is used. It is however advantageous to use a full set of guiding means 6 when installing at least the first row of floor elements 1.

Figure 9 shows, seen from above, an embodiment of the invention where rectangular floor elements 1 according to fig. 5 forms a so-called designed installation. The groove 11 and tongue is for the sake of clarity not shown. The installation corresponds in the main with the one illustrated in figure 8. The floor is however installed so that the latitudinal joints coincides over every third row. The arrow illustrates how next design carrying floor element 1 is joined with the previously installed ones.

Figure 10 shows, seen from above, an embodiment of the invention where rhomboidal floor elements according to fig. 3 forms a more advanced designed installation. The holes 4 (fig. 3) are however arranged parallel to the edge 2 which is closest to the edge 2 where the holes 4 are arranged. The groove 11 and tongue is for the sake of clarity not shown. Six rhomboidal floor elements 1 with a dark design is assembled by means of guiding means 6 so that the shape of a six-pointed star is formed. a number of rhomboidal floor elements 1 with a lighter design may then be joined around the already installed floor elements 1 by means of guiding means 6. Arrows illustrate how further floor elements 1 are joined with the already installed ones.

Figure 11 shows further, seen from above, an embodiment of the invention where rhomboidal floor elements 1 according to fig. 2 and hexagonal floor elements according to figure 4 together forms an advanced designed installation. The holes 4 (fig. 3) of the rhomboidal floor elements 1 are however arranged parallel to the edge 2 which is closest to the edge 2 where the holes 4 are arranged. The groove 11 and tongue is for the sake of clarity not shown. The floor

elements 1 are gradually joined by means of guiding means 6. Arrows illustrate how further floor elements 1 are joined with the previously installed.

Figure 12 shows, in cross-section, parts of two floor elements 1 and one guiding means 6 according to one embodiment of the invention. The floor elements 1 are provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor elements 1 are intended to be joined by means of tongue 12 and groove 11. The floor elements 1 are at their edges 2 provided with holes 4, which holes 4 extends inwards from the edge 2 mainly parallel with the decorative upper layer 3. The holes are arranged on a predetermined distance from the decorative upper layer 3 and on a predetermined distance from the closest corner (fig. 1) between two adjacent edges 2. The holes 4 are intended to each receive one part of a guiding means 6.

Figure 13 shows, in cross-section, parts of two floor elements 1 and one guiding means 6 according to another embodiment of the invention. The floor elements 1 are provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor elements 1 are intended to be joined by means of tongue 12 and groove 11. The floor elements 1 are at their edges 2 provided with holes 4, which holes 4 extends inwards from the edge 2 mainly parallel with the decorative upper layer 3. The holes are arranged on a predetermined distance from the decorative upper layer 3 and on a predetermined distance from the closest corner (fig. 1) between two adjacent edges 2. The holes 4 are intended to each receive one part of a guiding means 6. The holes 4 are provided with an inner gripping edge 4' which is achieved by milling a groove 4" from the lower side 7. See also figure 15. The groove 4" is perpendicular to the hole 4 and thereby parallel to the edge 2 where the hole 4, which is intersected by the groove 4", is arranged. The guiding means 6 is provided with two ends 6' each, which each are provided several resilient protrusions 60 which are intended to interact with gripping edges 4' of the holes 4 during assembly.

Figure 14 shows, in cross-section, parts of two floor elements 1 and one guiding means 6 according to yet another embodiment of the invention. The floor elements

1 are provided with edges 2, a lower side 7 and a decorative upper layer 3. The floor elements 1 are intended to be joined by means of tongue 12 and groove 11. The floor elements 1 are at their edges 2 provided with holes 4, which holes 4 extends inwards from the edge 2 mainly parallel with the decorative upper layer 3. The holes are arranged on a predetermined distance from the decorative upper layer 3 and on a predetermined distance from the closest corner (fig. 1) between two adjacent edges 2. The holes 4 are intended to each receive one part of a guiding means 6. The holes 4 are provided with an inner gripping edge 4' which is achieved by milling a step with larger diameter than the holes 4 on a predetermined depth after the drilling. The guiding means 6 is provided with two ends 6' each, which each are provided several resilient protrusions 60 which are intended to interact with gripping edges 4' of the holes 4 during assembly.

Figure 15 shows, seen from below, parts of the floor element 1 shown in figure 13. The holes 4 are provided with an inner gripping edge 4' which is achieved by milling a groove 4'' from the lower side 7. See also figure 13. The groove 4'' is perpendicular to the hole 4 and thereby parallel to the edge 2 where the hole 4, which is intersected by the groove 4'', is arranged.

The invention is not limited by the embodiments shown, since these can be varied in different ways within the scope of the invention. It is for example most advantageous to use glue when the floor elements 1 are to be joined even when embodiments with holes 4 having gripping edges 4' and guiding means with resilient protrusions 70 are used. These are foremost used for positioning the floor elements 1 so that gaps can be avoided and that a designed installation can be achieved by the one not skilled in the art without any need of special tools.

Floor elements 1 most often also includes a core covered with an upper decorative layer 3. The core is most often comprised by wood particles or wood fibre bonded with resin or glue. It is advantageous to surface treat the area around the joint if the floor is to be exposed to moisture since the wood of the core is sensitive to moisture. This surface treatment may suitably include resin, wax or some kind of lacquer. It is not necessary to surface treat the joint if it is to be

glued as the glue itself will protect the core from moisture penetration. The decorative upper layer 3 is constituted by a decorative paper impregnated with melamine formaldehyde resin. One or more layers of so-called overlay paper of α -cellulose which is impregnated melamine formaldehyde resin may possibly be placed on top of this. One or a few of these layers may be sprinkled with hard particles of α -aluminium oxide, silicon carbide or silicon oxide during the impregnation in order to improve the abrasion resistance. The lower side 7 may suitably be surface treated with lacquer or a layer of paper and resin.

CLAIMS

1. Floor element (1), which is mainly in the form of a board with triangular, quadratic, rectangular, rhomboidal or polygonal shape as seen from above, which floor element (1) is provided with edges (2), a lower side (7) and a decorative upper layer (3), whereby the floor elements (1) are intended to be joined via tongue and groove, characterised in that the floor elements (1) are on at least two opposite edges (2), preferably on all edges (2) provided with holes (4), which holes (4) extends inwards from the edge (2) mainly parallel to the decorative upper layer (3), that the holes (4) are arranged on a predetermined distance from the decorative upper layer (3) and on a predetermined distance from a closest corner between two adjacent edges (2), whereby the holes (4) are intended to receive each one part of a guiding means (6).
2. Floor element (1) according to claim 1, characterised in that the holes (4) extends perpendicular from the edge (2) where the holes (4) are arranged.
3. Floor element (1) according to claim 1, characterised in that the holes (4) extends parallel to the closest edge (2) which is adjacent to the edge (2) where the hole (4) is arranged.
4. Floor element (1) according to any of the claims 1 -3, characterised in that the floor element (1) has four edges (2), which edges (2) has the same length.
5. Floor element (1) according to claim 4, characterised in that each edge (2) is provided with each one hole group of two holes (4), which holes (4) in each hole group is arranged with a mutual distance of N and that the distance between the holes (4) and its closest corner between two edges (2) is $N/2$, whereby the length of the edge is $2N$.
6. Floor element (1) according to any of the claims 1 - 3, characterised in that the floor element (1) has two opposite edges (2) with a greater length than the two remaining edges (2).

7. Floor element (1) according to claim 6, characterised in that, the two shorter edges (2) are provided with each one hole group of two holes (4), which holes (4) in each hole group is arranged with a mutual distance of N and that the distance between the holes (4) and its closest corner between two edges (2) is $N/2$, whereby the length of the edge is $2N$ and that the two longer edges is provided each one hole group of three or more holes (4), of which the outermost holes (4) are arranged on a distance $L/2$ from its respective closest corner between two adjacent edges (2) while the distance between two adjacent holes (4) on the longer edges (2) is L , whereby the length of the longer side (2) is an integer larger than $3L$, preferably smaller than $30L$.
8. Floor element (1) according to claim 6, characterised in that the two shorter edges (2) are provided with each one hole group of two holes (4), which holes (4) in each hole group is arranged with a respective mutual distance of N and that the distance between the holes (4) and its respective closest corner between two adjacent edges (2) is $N/2$, whereby the length of the edge (2) is $2N$ and that the two longer edges (2) is provided with each one hole group of three or more holes (4), of which the outermost holes (4) are arranged on a distance of $L/2$ from its respective closest corner between two adjacent edges (2) while the distance between two adjacent holes (4), arranged on the two longer edges (2), is L , $2L$, $3L$, $4L$, $5L$ or combinations thereof.
9. Floor elements (1) according to claim 7 or 8, characterised in that the length L is equal to the length N .
10. Floor element (1) according to any of the claims 1 - 9, characterised in that the holes (4) are provided with an inner gripping edge (4').
11. Floor element (1) according to claim 10, characterised in that the holes (4) are provided with an inner gripping edge (4') by milling a groove (4'') from the lower side (7), which groove (4'') is perpendicular to the hole (4) and thereby parallel to the edge (2) on which the hole (4), which is intersected by the groove (4''), is arranged.

12. Floor element (1) according to claim 10, c h a r a c t e r i s e d in that the holes (4) are provided with an inner gripping edge (4') by milling a step with larger diameter on a predetermined depth after having drilled the hole.
13. Floor element (1) according to any of the claims 10 - 12, c h a r a c t e r i s e d in that the guiding means (6) are provided with two ends (6') each which each are provided with one or more resilient projections (60) which are intended to interact with the gripping edges (4') of the holes (4) during assembly.

Fig. 1a

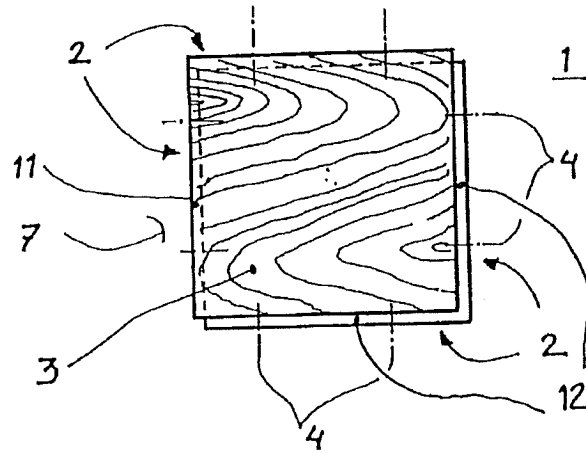


Fig. 1b

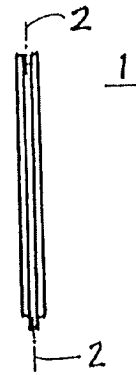


Fig. 2

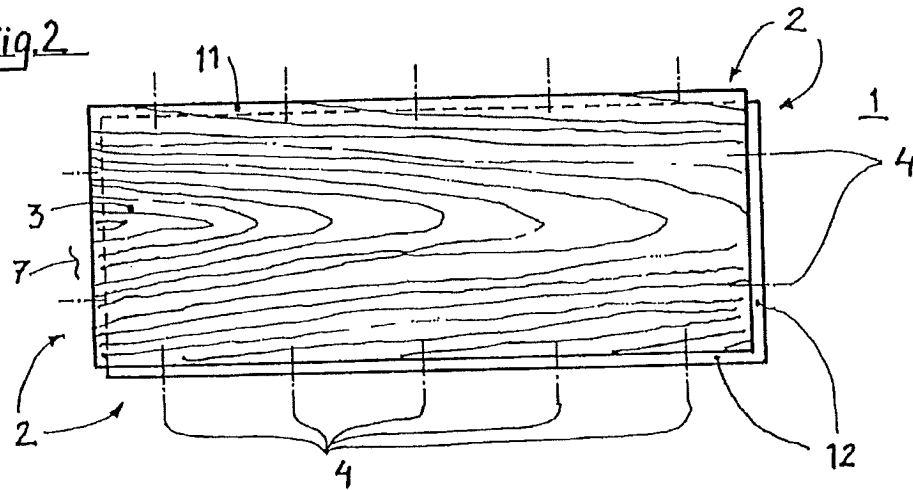


Fig. 3

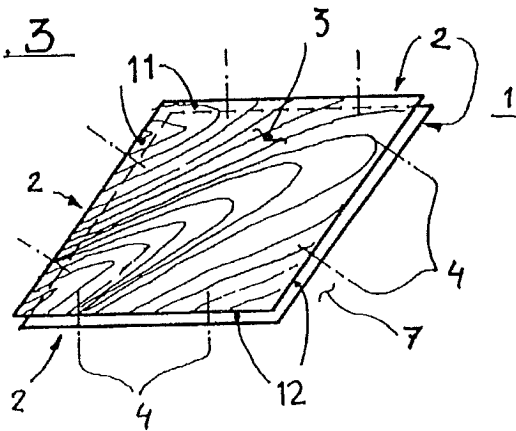


Fig. 4

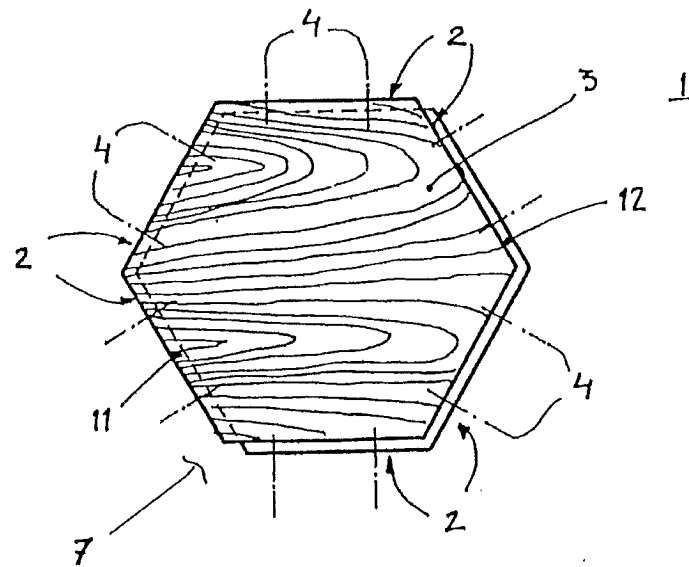


Fig. 5

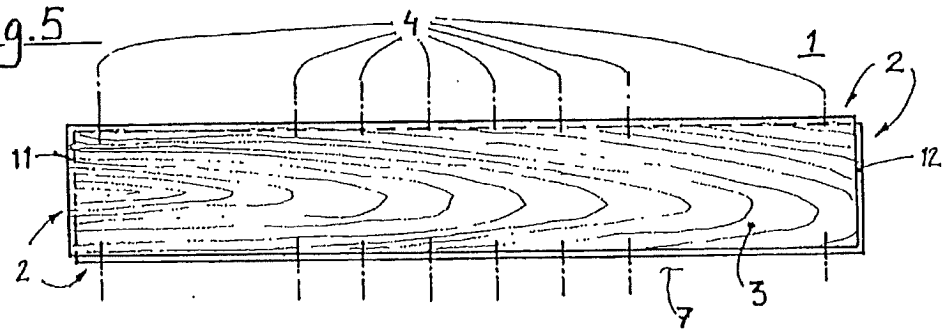


Fig. 6

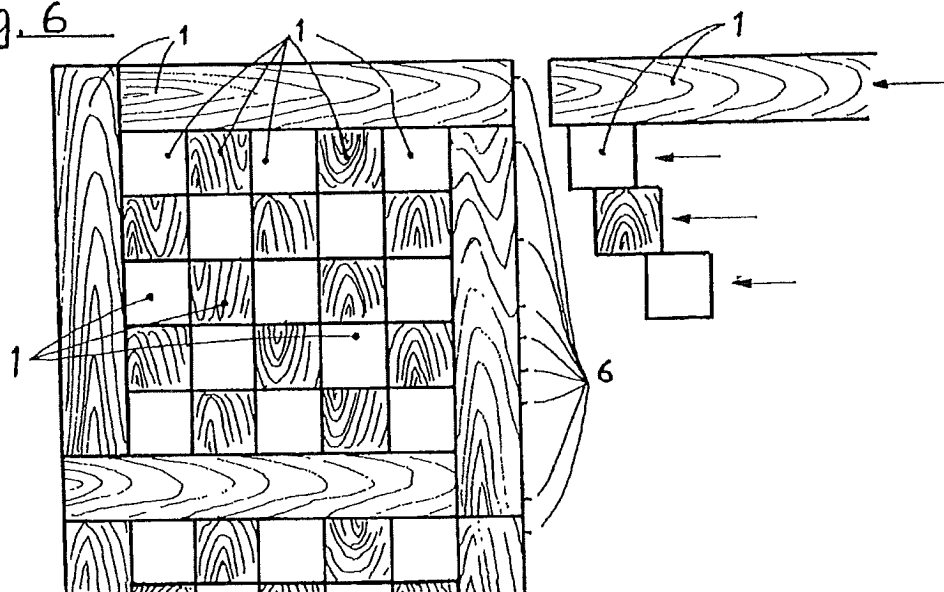


Fig. 7

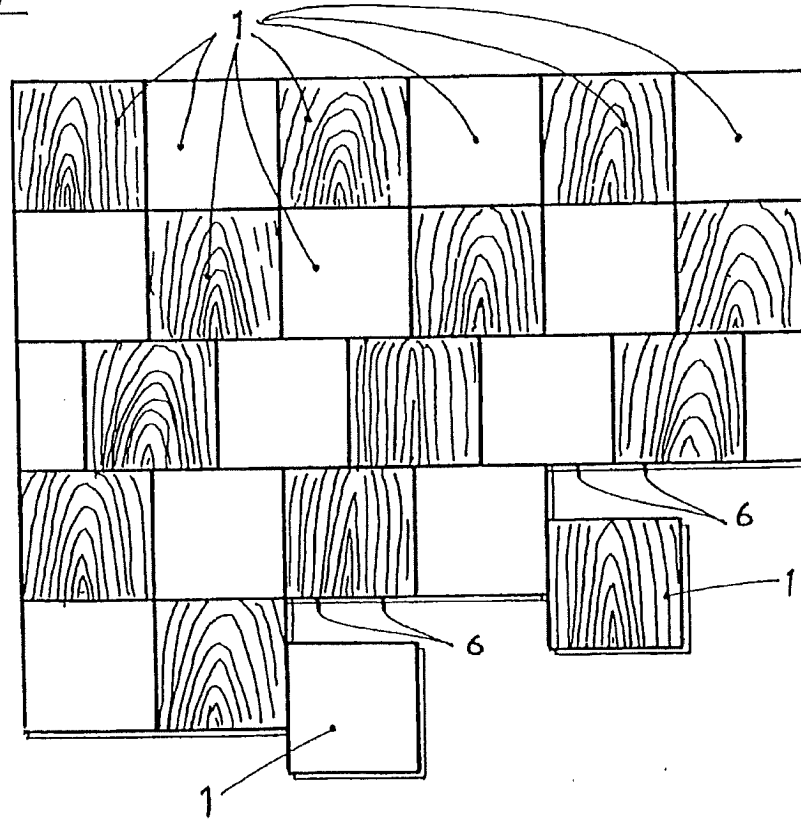


Fig. 8

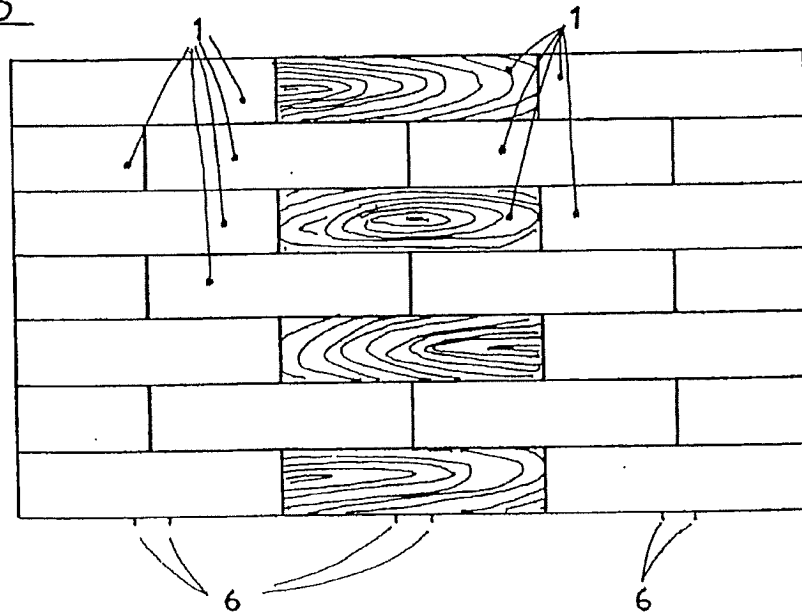


Fig. 9

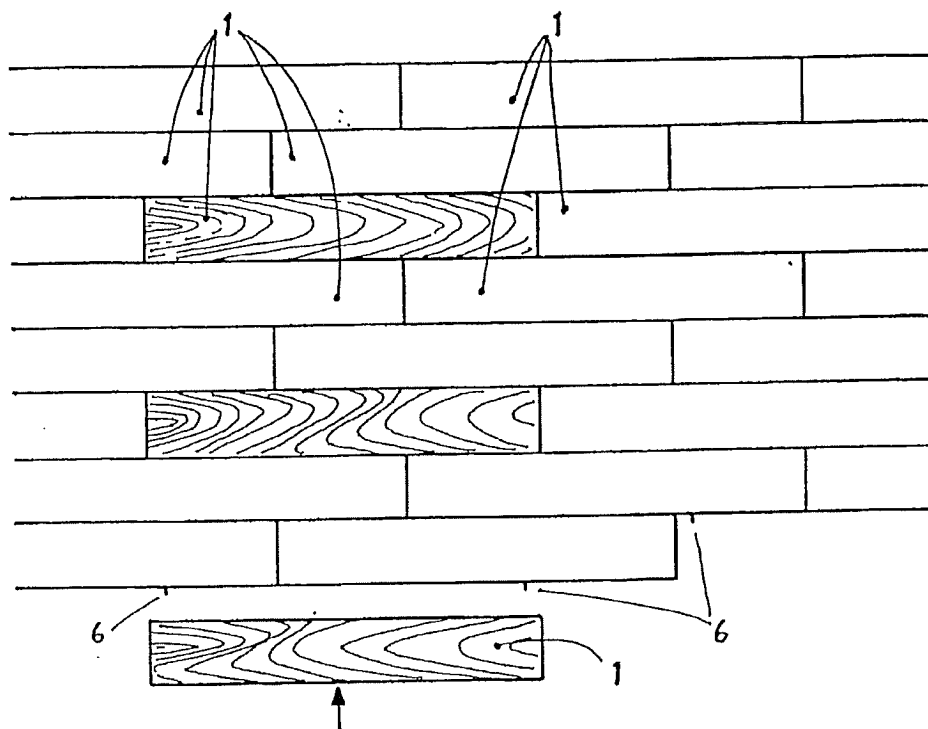


Fig. 10

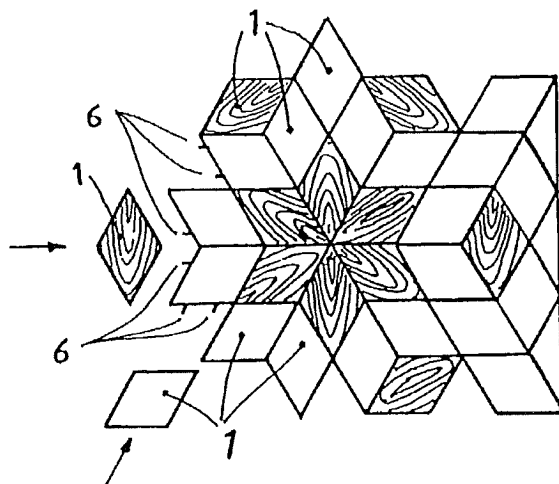


Fig. 11

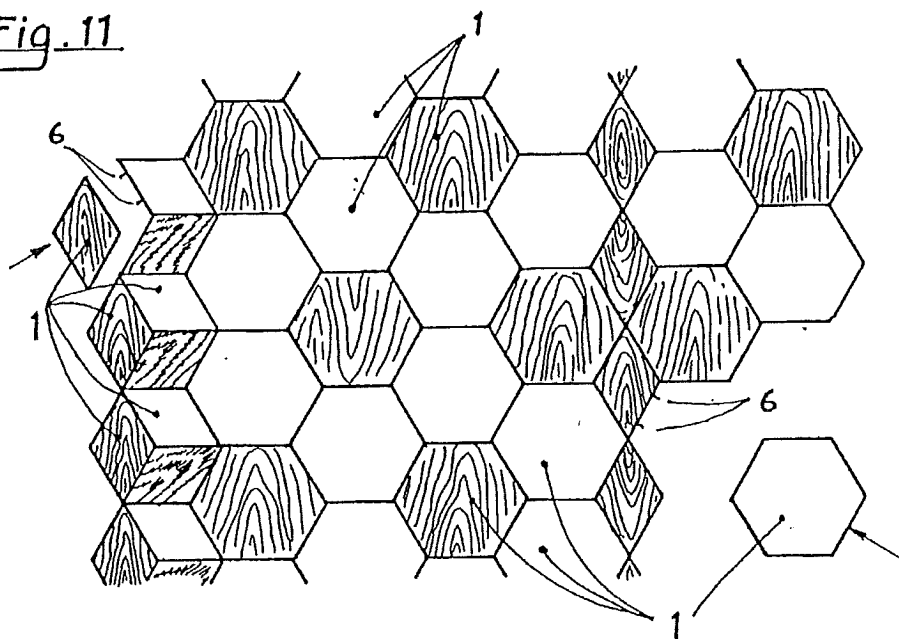


Fig. 15

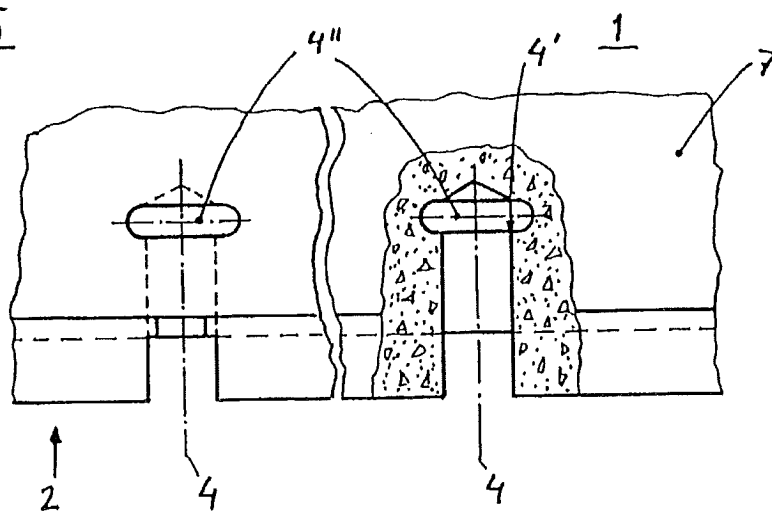
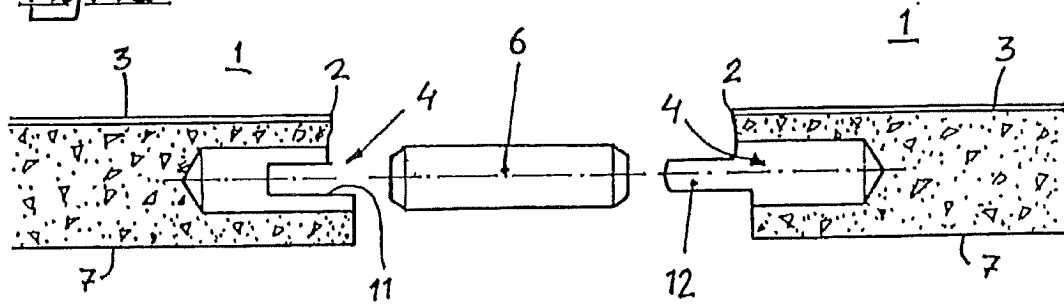
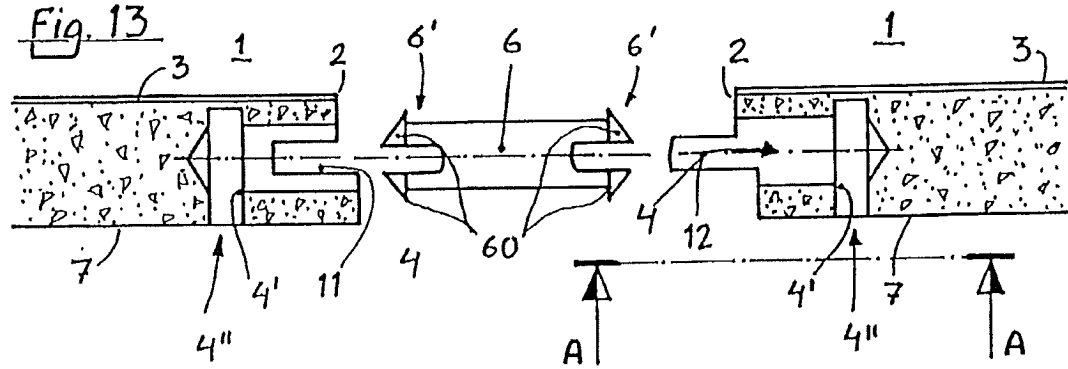
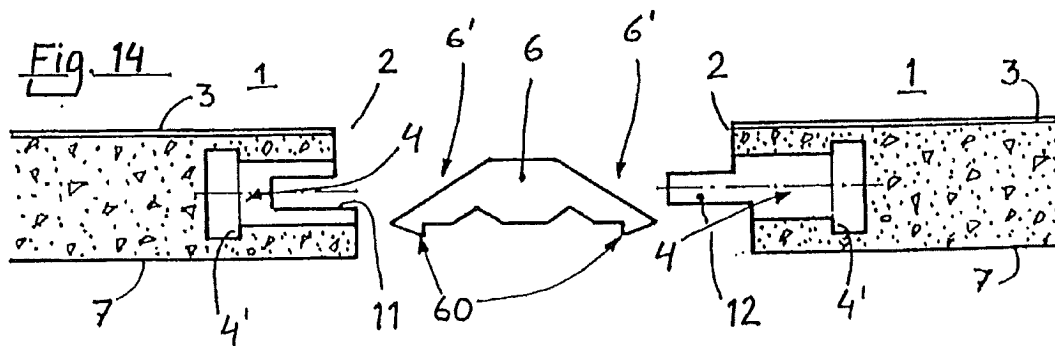


Fig. 12Fig. 13Fig. 14

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01385

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E04F 15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 3306609 A1 (BAUER, A.), 6 Sept 1984 (06.09.84), claim 1, detail 2,3 --	1-13
Y	EP 0652340 A1 (GERAUD, P.), 10 May 1995 (10.05.95), figure 1, abstract, detail 12,13 --	1-13
Y	DE 2101782 A (TARAVIN-KUNSTSTOFF-GMBH & CO KG), 20 July 1972 (20.07.72), figures 7-10 --	10-13
Y	GB 1212983 A (THERMO PLASTICS LIMITED), 18 November 1970 (18.11.70), figures 2-4 --	10-12

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

24 October 2000

Date of mailing of the international search report

07 -11- 2000

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01385

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2015813 A (H.C. NIELSEN), 1 October 1935 (01.10.35), figures 1,2, detail 10,13 -- -----	1-13

INTERNATIONAL SEARCH REPORT
Information on patent family members

03/10/00

International application No.
PCT/SE 00/01385

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
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EP	0652340	A1	10/05/95	FR 2712329 A,B	19/05/95
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GB	1212983	A	18/11/70	BE 711198 A FR 1553635 A NL 6802610 A US 3500606 A	23/08/68 10/01/69 26/08/68 17/03/70
US	2015813	A	01/10/35	NONE	